

REMARKS

The following remarks are submitted to address the issues raised in the Office Action mailed September 10, 2003.

Claims 1-20 are currently pending in the application. Claims 16-20 stand withdrawn from consideration. Claims 1-7, 12-13, and 15 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,360,640 to Cote (hereinafter “Cote”) in view of U.S. Patent No. 4,512,225 to Green (hereinafter “Green”). Claims 8-9 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Cote in view of Green as applied to claim 1, and further in view of Applicant Admitted Prior Art (hereinafter “AAPA”). Claims 10-11 and 14 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Cote in view of Green as applied to claim 1, and further in view of U.S. Patent No. 5,720,210 to Okahashi (hereinafter “Okahashi”).

Applicants have amended claim 12 to correct the accidental omission of the word “actual” to modify “current rotational position of the second roll.”. Applicants submit that this correction should not be viewed as narrowing the scope of claim 12 as Applicants submit that it was clear that the claim was referring to an actual current rotational position of the second roll.

Applicants have submitted herewith a Supplemental Information Disclosure Statement for consideration in the present application.

Applicants respectfully request consideration of the application in view of the following remarks.

Specification

Applicants have corrected the informality in the specification, which was objected to by the Examiner.

Dependent Claims

In responding to the claim rejections below, Applicants submit that the dependent claims are patentable based on their dependency from independent claims, which Applicants argue are patentable. Thus, in many instances, Applicants have not provided separate remarks specifically directed to the Examiner's grounds for rejecting the dependent claims. Applicants' failure to comment on or otherwise traverse the Examiner's rejection of the dependent claims should not be viewed as agreement, on the part of the Applicants, with the Examiner's grounds for rejection.

Claims 1-7, 12-13, and 15 – 35 U.S.C. 103(a)

The rejection of claims 1-7, 12-13, and 15 under 35 U.S.C. 35 U.S.C. 103(a) as being unpatentable over Cote in view of Green is respectfully traversed.

Embodiments of the present invention are directed to apparatuses for producing discontinuous lengths of filament. Embodiments of the present invention provide systems and apparatuses for synchronizing two rolls, each roll having a severing structure, to sever a length of filament. The synchronization of the two rolls can reduce or eliminate wear in the severing structure of both rolls.¹ Deterioration and wear in the rolls can deteriorate the

¹ See Spec., p. 2, ll. 1-3.

quality of the chopped product and also increase costs associated with operating and maintaining a fiber chopper.²

Claim 1 is directed to an apparatus for producing discontinuous lengths of filament that comprises a rotatable first roll having a first severing structure; a rotatable second roll having a second severing structure, the second severing structure corresponding with the first severing structure for severing a length of the filament positioned between the rolls; a drive system operable to independently rotate the first roll and the second roll according to a drive command; a sensor system operable to make measurements and generate current state signals representative of at least one actual current roll property of the first roll and at least one actual current roll property of the second roll; and a control system for receiving the current state signals and operable to generate the drive command in accordance with predetermined control parameters and based on the at least one actual current roll property of the first roll and the at least one actual current roll property of the second roll, wherein the drive command synchronizes the at least one actual current roll properties of the first roll and the second roll.

Cote is directed to methods and systems of cutting ribbons, which Cote defines “as any sheet-type or strip-type material, such as a paper web.”³ The system of Cote utilizes a cutting cylinder and an anvil cylinder, which rotate and operate to cut a ribbon that is provided to the cylinders at a constant velocity. A control device is provided to control the angular velocity of the cutting cylinder. The Cote system is directed to cutting variable length signatures from a ribbon traveling at a constant velocity using a cutting cylinder of a

² See *id.* at p. 1, ll. 16-34.

³ Cote, col. 1, ll. 65-66.

fixed diameter. The Cote system is designed to adjust the angular velocity of the cutting cylinder in order to cut ribbon of desired length when the desired length is longer or shorter than the circumference of the cutting cylinder from knife to knife. The angular velocity is calculated using an algorithm that includes the ribbon velocity, the desired signature length, the nominal signature length (the signature length that results when the cutting cylinder and the anvil cylinder rotate at a constant angular velocity relative to the ribbon), and time.⁴ This algorithm is used to develop a velocity profile of the angular velocity for the desired signature length.

Green relates to methods and apparatuses for cutting continuous sheets of material into predetermined lengths. A continuous wallboard line passes between two knife cylinders, each having a knife. A cleavage is made across the width of the wallboard when the blades of the knife cylinders are closest together. The knife cylinders “are interlocked through gears 15 such that motor 17 rotates knife cylinder 14 counterclockwise from the perspective of FIG. 1 and knife cylinder clockwise from the perspective of FIG. 1.”⁵ A roller 28, upstream of the knife cylinders, is in contact with the wallboard and coupled to a pulse generator which “generates a series of electrical pulses as a function of the length of continuous wallboard line 10 passing roller 28.”⁶ Another pulse generator measures the distance of travel from a park position of a blade on one of the knife cylinders. Neither the distance of travel nor any other property of the other knife cylinder is measured. A microprocessor

⁴ See *id.*, col. 5, ll. 30-43.

⁵ Green, col. 2, ll. 48-51.

⁶ *Id.*, col. 3, ll. 3-5.

“performs calculations on a continuous basis to control rotary knife 18 such that the continuous moving sheet of material is cut into predetermined lengths.”⁷

Applicants respectfully submit that claim 1 is patentable over Cote in view of Green because neither Cote nor Green teach or suggest a sensor system operable to make measurements and generate current state signals representative of at least one actual current roll property of the first roll and at least one actual current roll property of the second roll. The Examiner correctly notes that Cote does not disclose a sensor system.⁸

Applicants respectfully submit that Green also fails to teach or suggest a sensor system as claimed. In particular, Green does not utilize a sensor system to make measurements and generate current state signals representative of at least one actual current roll property of a first roll having a first severing structure and at least one actual current roll property of a second roll having a second severing structure. Green only measures the distance of travel of knife 18 on one of the knife cylinders (knife cylinder 14 as shown in FIG. 1). Applicants respectfully submit that Green does not measure the distance of travel of the blade on the other knife cylinder 16. The other roller that is monitored in Green is the upstream roller 28, which measures the length of continuous wallboard and which does not include any severing structure.

Applicants further note that although measuring the distance of travel of the blades on both knife cylinders may not be necessary in Green since the knife cylinders are interlocked,⁹ such interlocking also does not allow the knife cylinders to be independently rotated. One of

⁷ *Id.*, col. 3, ll. 28-31.

⁸ Office Action, mailed September 10, 2003, p. 3.

⁹ *See Green*, col. 2, ll. 48-52

the features recited in claim 1 is a “drive system operable to independently rotate the first roll and the second roll”¹⁰ In this regard, Green teaches away from the present invention.

Applicants respectfully submit that claim 1 is also patentable over Cote in view of Green because neither reference teaches or suggests a control system as recited in claim 1. With regard to Cote, Applicants first note that the Cote device does not detect or measure an actual current roll property of either the cutting roll or the anvil roll. Thus, the Cote device also does not teach or suggest “a control system . . . operable to generate [a] drive command in accordance with predetermined control parameters and based on the at least one actual current roll property of the first roll and the at least one actual current roll property of the second roll[,]” as recited in claim 1. Adjustments in the angular velocity of the cutting cylinder in Cote are made based on the algorithm shown at column 5, lines 30-42. Applicants respectfully submit that this algorithm does not consider actual current roll properties of the cutting cylinder or the anvil cylinder in calculating angular velocity.

Applicants also respectfully submit that Green fails to teach or suggest a control system as recited in claim 1. As noted above, Green does not make measurements and generate current state signals representative of at least one actual current roll property of a first roll having a first severing structure and at least one actual current roll property of a second roll having a second severing structure. Green only measures the distance of travel of knife 18 on one of its knife cylinders. Accordingly, Green does not teach or suggest “a control system . . . operable to generate [a] drive command in accordance with predetermined control parameters and based on the at least one actual current roll property of the first roll and the at least one actual current roll property of the second roll[,]” as recited in claim 1.

¹⁰ Claim 1.

Applicants also respectfully note that the Green device does not utilize a drive command that synchronizes the at least one actual current roll properties of the first roll and the second roll. As noted above, the knife cylinders of Green are interlocked. Thus, the Green device does not teach or suggest using a drive command that synchronizes the at least one actual current roll properties of the first roll and the second roll.

For at least the separate and independent reason that neither Cote nor Green teaches or suggests a sensor system operable to make measurements and generate current state signals representative of at least one actual current roll property of the first roll and at least one actual current roll property of the second roll as recited in claim 1, Applicants respectfully submit that claim 1 is patentable over Cote in view of Green. For at least the separate and independent reason that neither Cote nor Green teaches or suggests a control system operable to generate a drive command in accordance with predetermined control parameters and based on at least one actual current roll property of a first roll and at least one actual current roll property of a second roll as recited in claim 1, Applicants respectfully submit that claim 1 is patentable over Cote in view of Green. As claims 2-7 depend from claim 1 or an intervening dependent claim, Applicants likewise respectfully submit that these claims are also patentable.

Independent claim 12 recites an apparatus for producing discontinuous lengths of filament that comprises a rotatable first roll having a first severing structure; a rotatable second roll having a second severing structure, the second severing structure corresponding with the first severing structure for severing a length of filaments positioned between the rolls; a drive system operable to independently rotate the first roll and the second roll according to a first roll drive command and a second roll drive command, respectively; a

sensor system operable to receive rotational positional inputs representative of an actual current rotational position of the first roll and an current rotational position of the second roll, the sensor system further operative to generate a first roll current position state signal and a second roll current position state signal corresponding to the rotational positional inputs; a control system operable to receive the first roll current position state signal and the second roll position state signal and generate the first roll drive command and the second roll drive command, respectively, in accordance with a predetermined set of control parameters and as determined by the first roll current position state signal and the second roll current position state signal, wherein the control system determines the first roll drive command and the second roll drive command so that the respective positioning of the corresponding severing structures is synchronized during rotation of the first roll and the second roll.

Applicants respectfully submit that claim 12 is patentable over Cote in view of Green for reasons similar to those stated above in connection with claim 1. In particular, neither Cote nor Green teach or suggest “a sensor system operable to receive rotational positional inputs representative of an actual current rotational position of the first roll and an current rotational position of the second roll, the sensor system further operative to generate a first roll current position state signal and a second roll current position state signal corresponding to the rotational positional inputs” as recited in claim 12. The Examiner correctly noted that Cote does not disclose a sensor system.¹¹ As noted above, Green only measures the distance of travel of knife 18 on one of the knife cylinders (knife cylinder 14 as shown in FIG. 1), and does not measure the distance of travel of the blade on the other knife cylinder 16.

Accordingly, the Green system also does not utilize a sensory system as recited in claim 12.

¹¹ Office Action, mailed September 10, 2003, p. 3.

For at least this separate and independent reason, Applicants respectfully submit that claim 12 is patentable over Cote in view of Green. As claim 13 depends from claim 12, Applicants likewise respectfully submit that claim 13 is also patentable.

In addition, for reasons similar to those set forth above in connection with claim 1, Applicants also respectfully submit that claim 12 is patentable over Cote in view of Green because neither reference teaches or suggests “a control system operable to receive the first roll current position state signal and the second roll position state signal and generate the first roll drive command and the second roll drive command, respectively, in accordance with a predetermined set of control parameters and as determined by the first roll current position state signal and the second roll current position state signal, wherein the control system determines the first roll drive command and the second roll drive command so that the respective positioning of the corresponding severing structures is synchronized during rotation of the first roll and the second roll” as recited in claim 12.

The Cote device does not receive rotational positional inputs representative of an actual current rotational position of either its cutting roll or its anvil roll and thus does not generate current position state signals corresponding to the rotational positional inputs. Thus, the Cote device also does not teach or suggest a control system operable to receive current position state signals of its cutting roll and its anvil roll and does not generate roll drive commands in accordance with a predetermined set of control parameters and as determined by current position state signals.

Green also fails to teach or suggest the control system as recited in claim 12. Green only measures the distance of travel of knife 18 on one of its knife cylinders. Accordingly, Green does not teach or suggest a control system operable to receive a first roll current

position state signal and a second roll position state signal and generate a first roll drive command and a second roll drive command, respectively, in accordance with a predetermined set of control parameters and as determined by the first roll current position state signal and the second roll current position state signal. Further, as the knife cylinders of Green are interlocked, Green also does not utilize first and second roll drive commands. Applicants respectfully submit that Green teaches away from utilizing first and second roll drive commands since its knife cylinders are interlocked.

For at least the separate and independent reason that neither Cote nor Green teaches or suggests the control system as recited in claim 12, Applicants respectfully submit that claim 12 is patentable over Cote in view of Green. As claim 13 depends from claim 12, Applicants likewise respectfully submit that claim 13 is also patentable.

Independent claim 15 recites an apparatus for producing discontinuous lengths of filament that comprises a rotatable first roll having a first severing structure; a rotatable second roll having a second severing structure, the second severing structure corresponding with the first severing structure for severing a length of the filament positioned between the rolls; a drive system operable to independently rotate and radially position the first roll and the second roll according to a first roll drive command, a second roll drive command, and a roll spacing drive command; a sensor system operable to receive positional inputs representative of an actual current rotational position of the first roll, an actual current rotational position of the second roll, and an actual current radial spacing between the first roll and the second roll, the sensor system further operative to generate a first roll current rotational position state signal, a second roll current rotational position state signal, and a current radial spacing state signal corresponding to the positional inputs; and a control

system operable to receive the first roll current rotational position state signal, the second roll current rotational position state signal, and the current radial spacing state signal and generate the first roll drive command, the second roll drive command, and the spacing drive command, wherein the control system synchronizes the positioning of the first severing structure and second severing structure during rotation of the first roll and the second roll.

Applicants respectfully submit that claim 15 is patentable over Cote in view of Green for at least the reasons set forth above in connection with claim 12. In addition to those reasons, Cote and Green each fail to teach or suggest “a sensor system operable to receive . . . an actual current radial spacing between the first roll and the second roll, the sensor system further operative to generate . . . a current radial spacing state signal corresponding to the positional inputs” as recited in claim 15. While Green utilizes air cylinders 50 to allow both cutting operations and perforating operations, Applicants have not identified any disclosure in Green related to detecting or measuring the radial spacing between the knife cylinders or to generating a current radial spacing state signal. Similarly, Cote and Green also fail to teach or suggest “a control system operable to receive . . . the current radial spacing state signal and generate [a] spacing drive command” as recited in claim 15. For at least these additional reasons, Applicants also submit that claim 15 is patentable.

Claims 8-9 – 35 U.S.C. 103(a)

The rejection of claims 8-9 under 35 U.S.C. 35 U.S.C. 103(a) as being unpatentable over Cote in view of Green as applied to claim 1, and further in view of AAPA is respectfully traversed.

Applicants have previously set forth the deficiencies of Cote and Green with regard to claim 1. AAPA fails to cure these deficiencies. Because claims 8 and 9 depend from claim 1, Applicants respectfully submit that claims 8 and 9 are patentable over Cote in view of Green and AAPA.

Applicants respectfully traverse the Examiner's assertion that [i]t would have been obvious to one having ordinary skill in the art at the time the invention was made to employ slots as taught by AAPA on the modified device of Cote as an alternative counter structure."¹² The discussion of slots in the present application relates to rollers used in fiber choppers to break continuous lengths of filaments into individual short filament lengths.¹³

Cote is directed to methods and systems of cutting ribbons, which Cote defines as any sheet-type or strip-type material, such as a paper web. Applicants respectfully submit that the AAPA cited by the Examiner does not relate to the cutting of ribbons or paper webs. Accordingly, Applicants respectfully traverse the combination of AAPA with Cote and submit that claims 8 and 9 are also patentable for this reason.

Claims 10-11 and 14 – 35 U.S.C. 103(a)

The rejection of claims 10-11 and 14 under 35 U.S.C. 35 U.S.C. 103(a) as being unpatentable over Cote in view of Green as applied to claim 1, and further in view of Okahashi is respectfully traversed.

Applicants have previously set forth the deficiencies of Cote and Green with regard to claims 1 and 12. Applicants respectfully submit that Okahashi fails to cure these

¹² Office Action, mailed September 10, 2003, p. 3.

¹³ Specification, p. 1, ll. 6-15.

deficiencies. Accordingly, Applicants respectfully submit that claims 10-11 and 14 are patentable over Cote in view of Green and further in view of Okahashi.

The Examiner cites Okahashi as “disclos[ing] a sensor system having a sensor (29, 30) for sensing a radial spacing and a drive system for adjusting the radial spacing (34).”¹⁴ Applicant notes that Okahashi describes clearance detecting means that detect the actual clearance between the tip of a knife on a knife rotor and an external surface of a plane rotor and a clearance adjusting unit to adjust the clearance based on the detected data. Regardless of this disclosure in Okahashi, Okahashi still fails to teach or suggest the limitations of independent claims 1 and 12. For example, independent claim 1 includes a drive command that synchronizes the at least one actual current roll properties of the first and second roll, independent claim 12 includes a first roll drive command and a second roll drive command so that the respective positioning of the corresponding severing structures is synchronized during rotation of the first roll and the second roll. The limitations related to radial spacing in the dependent claims against which Okahashi is applied are in addition to this synchronization.

As Okahashi fails to cure the deficiencies of Cote and Green with regard to claims 1 and 12, Applicants respectfully submit that claims 10-11 and 14 are patentable over Cote in view of Green and further in view of Okahashi.

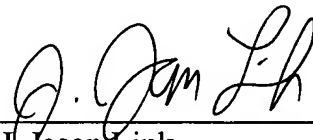
¹⁴ Office Action, mailed September 10, 2003, pp. 3-4.

CONCLUSION

For the foregoing reasons, a favorable Office Action is respectfully solicited. The Examiner is respectfully invited to contact J. Jason Link at 336.607.7443 or Charles W. Calkins at 336.607.7315 to discuss any matter relating to this application.

Respectfully submitted,

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